ovary

liver

muscle

testis

spleen

intestine

pancreas

seminal vesicle

kidney

brain

thymus

lung

heart

FIG. 1

```
1   CGGGCCAGGAGGAGGACCCCCACCTGTGAGCCTGCGACCCCCTTATGTTGCAGGCGAGAC   60
    R   A   R   R   R   T   P   T   C   E   P   A   T   P   L   C   C   R   R   D

61  CATTACGTAGACTTCCAGGAACTGGGATGGCGGGACTGGATACTGCAGCCCGAGGGGTAC  120
    H   Y   V   D   F   Q   E   L   G   W   R   D   W   I   L   Q   P   E   G   Y

121 CAGCTGAATTACTGCAGTGGGCAGTGCCCTCCCCACCTGGCTGGCAGCCCAGGCATTGCT  180
    Q   L   N   Y   C   S   G   Q   C   P   P   H   L   A   G   S   P   G   I   A

181 GCCTCTTTCCATTCTGCCGTCTTCAGCCTCCTCAAAGCCAACAATCCTTGGCCTGCCAGT  240
    A   S   F   H   S   A   V   F   S   L   L   K   A   N   N   P   W   P   A   S

241 ACCTCCTGTTGTGTCCCTACTGCCCGAAGGCCCCTCTCTCTCCTCTACCTGGATCATAAT  300
    T   S   C   C   V   P   T   A   R   R   P   L   S   L   L   Y   L   D   H   N

301 GGCAATGTGGTCAAGACGGATGTGCCAGATATGGTGGTGGAGGCCTGTGGCTGCAGCTAG  360
    G   N   V   V   K   T   D   V   P   D   M   V   V   E   A   C   G   C   S   *
```

FIG. 2

Family member	% identity with GDF-12
GDF-1	43
GDF-3	36
GDF-5	36
GDF-6	39
GDF-7	42
GDF-9	30
BMP-3	37
BMP-2	43
BMP-4	42
Vgr-1	41
OP-1	40
BMP-5	38
OP-2	39
MIS	30
Inhibin-α	27
Inhibin-βA	47
Inhibin-βB	50
Nodal	38
GDNF	21
TGF-β1	36
TGF-β2	36
TGF-β3	41

FIG. 4

```
   1  GAGCTGTGAGGGTCAAGCACAGCTATCCATCAGATGATCTACTTTCAGCCTTCCTGAGTC   60
  61  CCAGACAATAGAAGACAGGTGGCTGTACCCTTGGCCAAGGGTAGGTGTGGCAGTGGTGTC   120
 121  TGCTGTCACTGTGCCCTCATTGGCCCCCAGCAATCAGACTCAACAGACGGAGCAACTGCC   180
 181  ATCCGAGGCTCCTGAACCAGGGCCATTCACCAGGAGCATGCGGCTCCCTGATGTCCAGCT   240
                                         M  R  L  P  D  V  Q  L
 241  CTGGCTGGTGCTGCTGTGGGCACTGGTGCGAGCACAGGGGACAGGGTCTGTGTGTCCCTC   300
       W  L  V  L  L  W  A  L  V  R  A  Q  G  T  G  S  V  C  P  S
 301  CTGTGGGGGCTCCAAACTGGCACCCCAAGCAGAACGAGCTCTGGTGCTGGAGCTAGCCAA   360
       C  G  G  S  K  L  A  P  Q  A  E  R  A  L  V  L  E  L  A  K
 361  GCAGCAAATCCTGGATGGGTTGCACCTGACCAGTCGTCCCAGAATAACTCATCCTCCACC   420
       Q  Q  I  L  D  G  L  H  L  T  S  R  P  R  I  T  H  P  P  P
 421  CCAGGCAGCGCTGACCAGAGCCCTCCGGAGACTACAGCCAGGGAGTGTGGCTCCAGGGAA   480
       Q  A  A  L  T  R  A  L  R  R  L  Q  P  G  S  V  A  P  G  N
 481  TGGGGAGGAGGTCATCAGCTTTGCTACTGTCACAGACTCCACTTCAGCCTACAGCTCCCT   540
       G  E  E  V  I  S  F  A  T  V  T  D  S  T  S  A  Y  S  S  L
 541  GCTCACTTTTCACCTGTCCACTCCTCGGTCCCACCACCTGTACCATGCCCGCCTGTGGCT   600
       L  T  F  H  L  S  T  P  R  S  H  H  L  Y  H  A  R  L  W  L
 601  GCACGTGCTCCCCACCCTTCCTGGCACTCTTTGCTTGAGGATCTTCCGATGGGGACCAAG   660
       H  V  L  P  T  L  P  G  T  L  C  L  R  I  F  R  W  G  P  R
 661  GAGGAGGCGCCAAGGGTCCCGCACTCTCCTGGCTGAGCACCACATCACCAACCTGGGCTG   720
       R  R  R  Q  G  S  R  T  L  L  A  E  H  H  I  T  N  L  G  W
 721  GCATACCTTAACTCTGCCCTCTAGTGGCTTGAGGGGTGAGAAGTCTGGTGTCCTGAAACT   780
       H  T  L  T  L  P  S  S  G  L  R  G  E  K  S  G  V  L  K  L
 781  GCAACTAGACTGCAGACCCCTAGAAGGCAACAGCACAGTTACTGGACAACCGAGGCGGCT   840
       Q  L  D  C  R  P  L  E  G [ N  S  T] V  T  G  Q  P  R  R  L
 841  CTTGGACACAGCAGGACACCAGCAGCCTTCCTAGAGCTTAAGATCCGAGCCAATGAGCC   900
       L  D  T  A  G  H  Q  Q  P  F  L  E  L  K  I  R  A  N  E  P
 901  TGGAGCAGGCCGGGCCAGGAGGAGGACCCCCACCTGTGAGCCTGCGACCCCCTTATGTTG   960
       G  A  G [ R  A  R  R] T  P  T  C  E  P  A  T  P  L  C  C
 961  CAGGCGAGACCATTACGTAGACTTCCAGGAACTGGGATGGCGGGACTGGATACTGCAGCC   1020
       R  R  D  H  Y  V  D  F  Q  E  L  G  W  R  D  W  I  L  Q  P
1021  CGAGGGGTACCAGCTGAATTACTGCAGTGGGCAGTGCCCTCCCCACCTGGCTGGCAGCCC   1080
       E  G  Y  Q  L  N  Y  C  S  G  Q  C  P  P  H  L  A  G  S  P
1081  AGGCATTGCTGCCTCTTTCCATTCTGCCGTCTTCAGCCTCCTCAAAGCCAACAATCCTTG   1140
       G  I  A  A  S  F  H  S  A  V  F  S  L  L  K  A  N  N  P  W
1141  GCCTGCCAGTACCTCCTGTTGTGTCCCTACTGCCCGAAGGCCCCTCTCTCTCCTCTACCT   1200
       P  A  S  T  S  C  C  V  P  T  A  R  R  P  L  S  L  L  Y  L
1201  GGATCATAATGGCAATGTGGTCAAGACGGATGTGCCAGATATGGTGGTGGAGGCCTGTGG   1260
       D  H  N  G  N  V  V  K  T  D  V  P  D  M  V  V  E  A  C  G
1261  CTGCAGCTAGCAAGAGGACCTGGGGCTTTGGAGTGAAGAGACCAAGATGAAGTTTCCCAG   1320
       C  S  *
1321  GCACAGGGCATCTGTGACTGGAGGCATCAGATTCCTGATCCACACCCCAACCCAACAACC   1380
1381  ACCTGGCAATATGACTCACTTGACCCCTATGGGACCCAAATGGGCACTTTCTTGTCTGAG   1440
1441  ACTCTGGCTTATTCCAGGTTGGCTGATGTGTTGGGAGATGGGTAAAGCGTTTCTTCTAAA   1500
1501  GGGGTCTACCCAGAAAGCATGATTTCCTGCCCTAAGTCCTGTGAGAAGATGTCAGGGACT   1560
1561  AGGGAGGGAGGGAGGGAAGGCAGAGAAAAATTACTTAGCCTCTCCCAAGATGAGAAAGTC   1620
1621  CTCAAGTGAGGGGAGGAGGAAGCAGATAGATGGTCCAGCAGGCTTGAAGCAGGGTAAGCA   1680
1681  GGCTGGCCCAGGGTAAGGGCTGTTGAGGTACCTTAAGGGAAGGTCAAGAGGGAGATGGGC   1740
1741  AAGGCGCTGAGGGAGGATGCTTAGGGGACCCCCAGAAACAGGAGTCAGGAAAATGAGGCA   1800
1801  CTAAGCCTAAGAAGTTCCCTGGTTTTTCCCAGGGGACAGGACCCACTGGGAGACAAGCAT   1860
1861  TTATACTTTCTTTCTTCTTTTTTATTTTTTTGAGATCGAGTCTCGCTCTGTCACCAGGCT   1920
1921  GGAGTGCAGTGACACGATCTTGGCTCACTGCAACCTCCGTCTCCTGGGTTCAAGTGATTC   1980
1981  TTCTGCCTCAGCCTCCCGAGCAGCTGGGATTACAGGCGCCCACTAATTTTTGTATTCTTA   2040
2041  GTAGAAACGAGGTTTCAACATGTTGGCCAGGATGGTCTCAATCTCTTGACCTCTTGATCC   2100
2101  ACCCGACTTGGCCTCCCGAAGTGATGAGATTATAGGCGTGAGCCACCGCGCCTGGCTTAT   2160
2161  ACTTTCTTAATAAAAAGGAGAAAGAAAATCAACAAATGTGAGTCATAAAGAAGGGTTAGG   2220
2221  GTGATGGTCCAGAGCAACAGTTCTTCAAGTGTACTCTGTAGGCTTCTGGGAGGTCCCTTT   2280
2281  TCAGGGGTGTCCACAAAGTCAAAGCTATTTTCATAATAATACTAACATGTTATTTGCCTT   2340
2341  TTGAATTCTCATTATCTTAAAATTGTATTGTGGAGTTTTCCAGAGGCCGTGTGACATGTG   2400
2401  ATTACATCATCTTTCTGAC   2419
```

FIG. 3